Psychoanalysis, science and the seductive theory of Karl Popper

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Objective: To present a critique of the ideas of Karl Popper, the philosopher of science, whose depiction of psychoanalysis as a pseudoscience is often used to justify attacks on psychoanalysis.
Method: Published sources are used to provide a brief intellectual biography of Popper, a summary of his concept of science and a summary of criticisms of Popper's view of science. His depiction of psychoanalysis and Freud's reply are presented. Clinical, experimental and neurobiological research which refutes Popper's view is summarized.
Results: There is a vast scholarly published work critical of Popper's falsifiability criterion of science. Less recognized is Popper's misunderstanding and misrepresentation of psychoanalysis; his argument against it is logically flawed and empirically false. Even if Popper's theory of science is accepted, there is considerable clinical, experimental and neurobiological research in psychoanalysis which meets Popper's criterion of science.
Conclusion: Attacks on psychoanalysis based on Popper's theory of science are ill-founded and reflect inadequate scholarship.
Key words: evidence, falsifiability, philosophy of science, psychoanalysis, science.

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Attacks on psychoanalysis and the long-term therapies derived from it, have enjoyed a long history and much publicity [1–4]. Yet, the justification for such attacks has been challenged on many grounds, including their methodology [5] and the empirically demonstrable validity of core psychoanalytic concepts [6,7]. Also, burgeoning neuroscience research, some of which is summarized below, indicates likely neurological correlates for many key clinically derived psychoanalytic concepts such as self-coherence [8], repression [9] and projective identification [10].

Furthermore, the effectiveness of psychoanalysis and its derivative therapies has been supported by empirical research [11,12], particularly for patients with DSM axis II pathology. Despite this evidence, the attacks on psychoanalysis continue unabated, not only from some psychiatrists [13,14] but also from the highest levels of politics and health bureaucrats [15], although what exactly is being attacked is often unclear.

An equally unfocused reply hardly constitutes a scholarly discourse, so before proceeding further, we wish to clarify our focus when discussing 'psychoanalysis' in this paper. The term psychoanalysis encompasses several distinct but related domains. First, it is a method of observation of mental functioning; second, it is a group of theories of the mind; and finally, it is a method of psychotherapy. In this contribution, we are limiting our discussion of psychoanalysis to one issue in the first domain, namely Popper's misunderstanding of Freud's method of verification of psychoanalytic interpretations. We inevitably touch upon other aspects of psychoanalysis, but they are not our focus here.

Popper believed that psychoanalysis could not be falsified and was therefore not scientific. This much-publicized view of Popper, uncritically accepted, often seems to be coupled with the assumption that it is also

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acceptable not to bother looking at the actual evidence. Before discussing in detail Popper's belief about falsifiability in psychoanalysis, we shall briefly outline some of the influences on the development of his thinking.

Karl Popper and his theory of science [16–18]

Karl Popper was born in Vienna in 1902, into a distinguished legal family. He studied at the University of Vienna to become a teacher and youth worker before being drawn to mathematics and philosophy. A youthful flirtation with a rather extreme form of Marxism was soon replaced by what might be described as Fabian-style socialism. Psychoanalysis, particularly the ideas of Alfred Adler, was considered by these democratic socialist reformers to be relevant for workers and intellectuals seeking to understand the shared difficulties they faced in trying to improve society. Popper grew disillusioned with socialism, apparently disappointed by the equivocation of the Viennese democratic socialists who were reluctant to ally themselves with the bourgeoisie against the emerging forces of fascism in the 1930s [16, pp.328–329]. Later, he adopted a form of small-l liberalism which rejected grand political or social revolutions and centralized government-sponsored 10-year plans in favour of what he termed 'piecemeal social engineering', wherein small social changes for the betterment of society are implemented and their effects reviewed before attempting further change.

Popper's *Logic of scientific discovery* [19] was published in 1935, though it received little attention at the time. Having unsuccessfully sought an academic position in the UK, he left Vienna for New Zealand shortly before the outbreak of the Second World War and settled in Christchurch, where he lectured at the then Canterbury College of the University of New Zealand and from where he wrote his influential *The open society and its enemies* [20]. He finally went to the UK in 1947 and spent most of his remaining professional life at the London School of Economics. He died in 1994.

Popper [18, pp.37–38] recounts that while in Vienna in 1919, he was overwhelmed by a lecture he attended, given by Albert Einstein, which described some of the amazing discoveries in the New Physics of the atom and quantum mechanics. It was in the same year that Eddington's expedition conducted observations during an eclipse of the sun to test Einstein's general theory of relativity using the predictions that theory made about the effects of gravity on light waves. Eddington's observations supported the 'risky' predictions made by the theory. Popper contrasted this with what he claimed were theories of Marx, Freud and Adler, then in vogue in Vienna, theories which Popper claimed were always confirmed irrespective of whether or not the predictions which followed from the theory actually occurred.

The philosophers, scientists and mathematicians who constituted the Vienna Circle had proposed a theory of meaning based on the idea that a statement is meaningful if it can be verified by experience. This doctrine of 'logical positivism' held that verification of a (theoretical) statement by experience (observation) was the hallmark of science. Central to such an understanding of science was the role of inductive reasoning (i.e. generalizing from known observables to as-yet unobserved situations).

Unlike the Vienna Circle, Popper argued that the verification of predictions derived from a theory is not the distinguishing feature of science. Rather, it is the possibility of specifying what observations, if they were to occur, would stand as a refutation of a given theory which is the hallmark of the scientific method. For Popper, it is deductive (i.e. reasoning from observation which may disconfirm a theory) rather than inductive reasoning (reasoning from any number of observations which appear to have confirmed a theory) which is the characteristic of a scientific theory.

Popper [21, pp.34–35] writes:

> I found that those of my friends who were admirers of Marx, Freud and Adler, were impressed by a number of points common to these theories, and especially by their apparent explanatory power. These theories appeared able to explain practically everything that happened within the fields to which they referred. The study of them seemed to have the effect of an intellectual conversion or revelation, opening your eyes to a new truth hidden from those not yet initiated. Once your eyes were thus opened you saw confirming instances everywhere; the world was full of verifications of the theory. Whatever happened always confirmed it . . . every conceivable case could be interpreted in the light of Adler's theory, or equally of Freud's. I may illustrate this with two very different examples of human behaviour: that of a man who pushes a child into the water with the intention of drowning it; and that of a man who sacrifices his life in an attempt to save the child. Each of the two examples could be explained with equal ease in Freudian and Adlerian terms. According to Freud the first man suffered from repression (say of some component of his Oedipus complex), while the second man achieved sublimation. I could not think of any human behaviour which could not be interpreted in terms of (either) theory. It was this fact, that they always fitted, that they were always confirmed – which in the eyes of their admirers constituted the strongest argument in favour of those theories. It began to dawn on me that this apparent strength was in fact their weakness.

What Popper has described here is the attribution of unconscious motives to people on the basis of a theory, with no supporting clinical evidence. That is not psychoanalysis! It is, in fact, a caricature of psychoanalysis of a type specifically condemned by Freud [22] as 'wild' psychoanalysis, that is, coming to conclusions about unconscious motives, without going through the long painstaking process of overcoming the specific defences used by that individual, in order to be in a position to understand their particular unconscious motives. Indeed, it was only by ignoring the way psychoanalytic theorizing proceeds from transference and defence analysis in the clinical situation that Popper could construct his caricature of psychoanalysis, which he was then able to demolish with such ease. Mistaking 'wild' psychoanalysis for real psychoanalysis, Popper incorrectly concluded that real psychoanalysis claimed to be right about everything and could not be falsified.

Popper's falsifiability criterion of science is seductive in its simplicity, but its simplicity is achieved by its failure to address not only the clinical issues but also the many philosophical issues, which have been raised in the extensive scholarly published work critical of Popper's account. Curiously, this published work is ignored by those who invoke Popper to criticize psychoanalysis. The main criticisms may be summarized as:

1 Historians of science [23,24] using the case-study method of theory change in science, including psychoanalysis [23], have shown the inadequacy of Popper's criterion as a description of how scientists actually work and how theories change in the practice of science. In these accounts, inductive reasoning and the verification of hypotheses play a crucial role.

2 Some medical scientists describe Popper's criterion as counterproductive in the real world [25]. For example, in formulating epidemiological hypotheses concerning the spread of HIV–AIDS, which have public health and clinical implications, a Popperian approach which insists on strict falsification of hypotheses is less useful and less frequently used in actual practice than one which uses induction to generalize from observations in a professionally disciplined way.

3 Popper neglected the crucial role played by concepts and models in scientific theorizing [24,26]. Concepts and models (including ideational, mathematical and material models) are not epiphenomena produced as an incidental by-product of scientific thinking, but actively shape the way scientists think about their field and the questions they ask. Watson and Crick's use of a material model to discover the double helix structure of DNA is a well-known example.

4 The probability calculus posed difficulties for Popper as did Heisenberg's Uncertainty Principle which challenged a strict falsificationist view of science and led to some personal friction between Popper and Heisenberg [16, pp.257–259].

5 Popper insisted that there is but one scientific method, equally applicable to the natural sciences (mathematics, physics, biology, astronomy, geology) social sciences (anthropology, linguistics, sociology, ethnology, history) and all other endeavours which claim to be scientific [27,28].

6 Popper misrepresented historicism in general and Marxist theory in particular [29,30]. The term 'historicism' was used by historians long before Popper to refer to the historian's attempt to empathize with people about whom they were writing so as to understand them and their social conditions as they understood themselves and which gave rise to certain actions and events, that is, a contextualist, empathic method of historical scholarship. Popper used the term historicism in an idiosyncratic way to mean a belief in deterministic or teleological laws governing historical change which he attributed to Plato, Marx and Hegel. Thus, Popper claimed that some of Marx's predictions, such as the increasing pauperization of the working class under capitalism which would create the conditions for revolution, were clearly falsified by the time he (Popper) was writing, almost a century after Marx. In response, some scholars have argued that two World Wars and the rise of the Welfare State served to distract the working class in developed society from its lack of economic and political power, while the pauperization that Marx predicted has occurred in the so-called underdeveloped countries. Other commentators believe that the pauperization of the working class has in fact occurred, relative to the advance of other socioeconomic groups. Still others hold that the Welfare State was a direct response to Marx's theory, raising the question of how human will operates in the social sciences in ways that make them radically different from the natural sciences. So social sciences may still claim to be scientific but Popper's falsification criterion is irrelevant/inappropriate to social science.

7 Contrary to Popper's claim against psychoanalysis, the use of a theory to save itself from apparently falsifying instances does not, prima facie, render it unscientific. Most scientific theories include so-called auxiliary statements, including those which guide the use of instruments and methods of observation that may be relevant to the apparent falsification of the theory in question [31]. Thus, the fact that an aeroplane crashes on take-off is not a valid refutation

> of the Newtonian mechanics which were applied to the design of the aeroplane. On the contrary, auxiliary hypotheses to do with wind resistance, surface friction and metal fatigue are invoked to explain the accident, explanations which are themselves derived from Newtonian mechanics.

Beginning in the 1970s, several alternative models (to Popper's) of scientific practice and theory change were proposed, including those of Kuhn [32], Feyerabend [33], Lakatos [34] and Bloor [35], which, to varying degrees, allow for political, sociological and contextual factors as well as both inductive and deductive logic to have valid roles in science.

Popper [36] eventually revised his account of human knowledge, proposing a 'three-world doctrine': world 1 is the world of external objects; world 2 is the world of experience; and most controversially, world 3 is the world of culture and its artefacts and institutions, including the books, libraries and microchips which house concepts and ideas. Rather than truth, Popper proposed 'verisimilitude' as the aim of a scientific theory. Critics, including some hitherto staunch admirers [37], found these ideas increasingly muddled or lapsing into the Platonic essentialism that he [20] had condemned in his wartime anti-totalitarian essay, *The open society and its enemies*.

However, few of these criticisms of Popper specifically address his attack on psychoanalysis, to which we shall now return. Despite the doubts which these criticisms cast on Popper's falsifiability criterion, let us concede that falsifiability is an important issue in science (though not the only one) and continue our examination of psychoanalysis from that perspective.

Psychoanalysis and its falsifiability

Freud himself answered Popper's criticism that psychoanalysis cannot be falsified in his 1938 paper, 'Constructions in analysis'. He began [38, p.257]:

> It has always seemed to me to be greatly to the credit of a certain well-known man of Science that he treated psychoanalysis fairly at a time when most other people felt themselves under no such obligation. On one occasion, nevertheless, he gave expression to an opinion upon analytic technique which was at once derogatory and unjust. He said that in giving interpretations to a patient we treat him upon the famous principle of 'Heads I win, tails you lose.' That is to say, if the patient agrees with us, then the interpretation is right; but if he contradicts us that is only a sign of his resistance, which again shows that we are right. In this way we are always in the right against the poor helpless wretch whom we are analyzing, no matter how he might respond to what we put forward.

Freud then discussed in detail the clinical method of confirming or falsifying interpretations in an analysis. Freud made the point that while the patient's 'No' is not taken at its face value, neither is 'Yes'. The evaluation of the truth or falsity of an interpretation or construction in analysis is not made simply on the grounds of the patient's agreement or disagreement with it. This does not mean that there are no grounds for evaluation of the truth in an analysis. It means that the method of evaluation is not so simple. It certainly does not mean that all interpretations (or constructions) are assumed to be true regardless of the patient's response. Freud makes this point explicitly. He says [38, p.262]:

> It is true that we do not accept a 'No' of a person under analysis at its face value; but neither do we allow his 'Yes' to pass. There is no justification for accusing us of invariably twisting his remarks into a confirmation .... The 'Yes' has no value unless it is followed by indirect confirmations .... A 'No' from a person in analysis is quite as ambiguous as a 'Yes'.

Freud then proceeded to discuss four effects an interpretation might have on a patient's mental processes, that may serve to assess the truth of falseness of an interpretation in psychoanalysis.

The first is 'a form of words that is used' [38, p.263]. Freud says that if a patient replies to the interpretation by saying, 'I didn't ever think [that]', or 'I shouldn't ever have thought that', then we may suspect that the interpretation is on the right track. Most psychoanalysts today would not rely heavily on the patient's use of this particular form of words as substantiating the truth of an interpretation. However, in conjunction with some other indicators (below) it might add a little more weight.

The second is 'An association which contains something similar or analogous to the content of the construction [or interpretation]' [38, p.263]. This may be a thought about some present or past event with a similar affective content or relationship pattern, a similar affective content or pattern in the transference, a dream of similar content etc. This sort of direct similarity nowadays is regarded by psychoanalysts as stronger evidence that the analyst's understanding of the patient as expressed in the interpretations is accurate.

The third is indirect similarities in the form, structure or content of the associations. Discussing this Freud said:

> It is particularly striking when, by means of a parapraxis, a confirmation of this kind insinuates itself into a direct denial. [38, p.264]

An example was given by a 30-year-old unmarried male who had sought therapy for panic attacks occurring against a background of recurrent difficulties in maintaining relationships with women. In the context of the emerging transference, his fear of closeness (which seemed unconsciously to underpin his panic attacks) and his denial of his wish for closeness (the latter being what the therapist sensed the patient wanted from him) were both expressed by the patient's response to an interpretation, 'I want to keep you at arm's link', when he meant to say, 'at arm's length'.

The fourth is what Freud called a 'negative therapeutic reaction', about which he said [38, p.265]:

> If the construction is wrong, there is no change in the patient; but if it is right or gives an approximation to the truth he reacts to it with an unmistakable aggravation of his symptoms and of his general condition.

A strong reaction of any type to an interpretation suggests that the interpretation does mean something to the patient. Of course, blatantly offensive remarks will cause a reaction in anyone, patient or otherwise, but a competently conducted analysis should be free of that sort of gross countertransference acting out. It is then and only then that a 'negative therapeutic reaction' assumes the status of evidence. Although some negative therapeutic reactions may be in response to an interpretation which, although true, may be unwelcome to a patient and as such, can provide a clue to the validity or falsity of an interpretation, not all negative developments in treatment can be mindlessly counted as evidence of 'correct' interpretations. Such mindlessness would not be analysis.

The clinical evidence for the truth or falsity of an interpretation provided by the above four types of observation is neither exhaustive nor absolute and analysts need to be mindful of its limits and the danger of distortion from their own unconscious. Yet, it is evidence. In a debate about evidence in psychoanalysis, at least one should discuss the merits of the types of observation that Freud described and analysts' use of them, rather than the spurious argument that analysts claim to be right whatever the patient says or does.

We are not trying to claim the idea that many psychoanalytic hypotheses are falsifiable, as something new that we have discovered. It is a mainstream view in the philosophy of science, but does not seem able to penetrate psychiatry or health bureaucracies. For example, the eminent contemporary philosopher of science, Adolf Grunbaum [39], who has his own criticisms of psychoanalysis, which we have discussed elsewhere [40], pulls no punches in his rejection of Popper's view that psychoanalysis cannot be falsified. He says [39, p.108],

> Even a casual perusal of the mere titles of Freud's papers and lectures in the Standard Edition yields two examples of falsifiability .... The first is the paper, 'A Case of Paranoia Running Counter to the Psychoanalytic Theory of the Disease' (S.E. 1915, 14:263–272); the second is the lecture, 'Revision of the Theory of Dreams' (S.E. 1933, 22:7–30, especially pp.28–30).

That is to say, Freud himself observed evidence to falsify some of his own theories.

In addition to the method of clinical evaluation, considerable empirical research with the capacity to falsify psychoanalytic hypotheses has now been undertaken and published. A comprehensive review is beyond the scope of this paper, but a few examples can be cited.

One extensive study is Luborsky's [6] transference research using the Core Conflictual Relationship Theme (CCRT) method. It is manually based and has good interrelater reliability. It validated the concept of transference by showing that attributes that patients usually ascribe to others in their lives become attributed to their analysts or psychotherapists in therapy. However, reporting this positive result is not our aim here; the point we wish to make is that these studies have the potential to confirm or falsify the psychoanalytic hypothesis of transference.

Graff and Luborsky have studied transference and resistance in psychoanalysis [7]. In successful analyses transference and resistance were high in the initial stage of therapy. In the middle stage the level of transference remained steady but the level of resistance fell. In the unsuccessful analyses the resistance rating did not fall in the middle stage. This study too, has the potential to falsify a core psychoanalytic hypothesis, namely that success in an analysis depends upon the patient's success in overcoming resistance to unconscious contents becoming conscious.

Attachment studies also have much to offer in regard to the evaluation of psychoanalytic hypotheses. Systematic empathically attuned experimental observations with the potential to falsify the psychoanalytic theory of the significance of a child's play for his or her developing sense of self have been reported [41, pp.253–289], as have systematic observation studies of mother–infant interaction which test the conditions required for the development of an emotionally attuned, competent self [42].

Numerous other experimental methods with the potential to falsify psychoanalytic concepts have been devised. Most of these studies have been included in Doidge's [43] overview of empirical evidence for the core concepts and efficacy of psychoanalytic therapy, including its cost-effectiveness.

Neuropsychoanalysis: a new intellectual framework for psychiatry?

Now that imaging of brain functioning as well as structure has become a reality, the study of the neuroscience correlates of conscious and unconscious psychic processes has advanced as a new field of study. Kaplan-Solms and Solms [44] have coined the term 'neuropsychoanalysis' to describe a new discipline, which brings together the dynamic localization method of the Russian neuropsychologist Luria, and psychoanalysis. Solms [44–47] has proposed a neurological model of the mind congruent with psychoanalysis. This development has created an important new observational and experimental domain in the continuing work of testing psychoanalytic hypotheses. The contribution now required from psychoanalysts is to articulate clear hypotheses, whose biological correlates (in a model such as Solms's) can be studied by objective experimental means. This issue has been addressed elsewhere in more detail by one of the authors of this paper [48].

An example of such a study is Shevrin's [9] experiments on the neurological correlates of repression. He showed that words related to a patient's unconscious conflicts, when flashed subliminally, evoke brain potentials. Control words unrelated to the patient's conflicts do not do so. Interestingly, when the same words were flashed supraliminally the result was reversed and recognition of the conflict-related words took longer than the control words. These results suggest that some type of repression or inhibitory process is active. Theoretically, they could just as easily have falsified the hypothesis that repression of conflict occurs.

Melanie Klein [49] introduced the clinical concept of projective identification to explain certain primitive states of mind. This was extended to psychoanalytic explanations of empathy [50], of unconscious communication [51] and trans-generational transmission of psychic trauma [52]. Integrating a vast amount of clinical and extraclinical research, Schore [51] has proposed neurobiological correlates of a healthy and pathogenic projective identification in mother–child interaction and in psychotherapy. The recently discovered system of mirror neurons provides possible biological correlates for such unconscious perception and communication. Greatrex [10] says:

> It [the discovery of mirror neurons] suggests that the mechanism of inference is based on unconscious physiological and psychological matching capacities. Our spontaneous matching capacity . . . may be part of a system that is a key to intentional communication on many levels.

Studies such as these are providing psychoanalysis with a new dimension in science, advancing towards the realization of Kandel's [53] vision of a psychoanalytically informed science of psychiatry; a psychiatry which truly studies the mind and its disorders.

Conclusion

Popper, like many others, was understandably dazzled by the New Physics at the beginning of the twentieth century. At that time, Otto Neurath [16, p.95], a philosopher of the Vienna Circle, tartly noted that 'he [Popper] took the Eddington experiment and turned it into a method for the whole of science'. Bedazzled as he was, Popper seemed unable to see the relationship between psychoanalysis and evidence. Granted, much of the empirical evidence we have quoted above has accumulated since 1919 when Popper first contrasted psychoanalysis with the New Physics, yet the fact remains that psychoanalysis was no more inherently unfalsifiable at that time than it is now. Even in 1919, at the time of his bedazzlement, the first of the Freud papers referred to by Grunbaum (above) was available to Popper, and by 1935, when Popper published *The logic of scientific discovery*, the second was also available. How Popper, with his undoubtedly acute and incisive mind, could so misunderstand psychoanalysis despite the evidence available to him, must remain in the field of conjecture; but misunderstand it he did. As a recent detailed and otherwise admiring biography of Popper notes, 'his brief critique of psychoanalysis never accounted for his intense hostility towards it' [16].

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